A description of two-generated subalgebras of a polynomial ring in one variable
and a new proof of the AMS theorem

Abstract:

The famous AMS (Abhyankar-Moh-Suzuki) theorem states that if two polynomials $f$ and $g$ in one variable with coefficients in a field $F$ generate all algebra of polynomials, i.e. any polynomial $h$ in one variable can be expressed as $h = H(f, g)$ where $H$ is a polynomial in two variables, then either the degree of $f$ divides the degree of $g$, or the degree of $g$ divides the degree of $f$, or the degree of $f$ and the degree of $g$ are divisible by the characteristic of the field $F$. There were several wrong published proofs of this theorem and there are many correct published proofs of this theorem but all of them either long or not self-contained. Recently I found a (relatively) short and self-contained proof which is not published yet and which I can explain in one-two hours.